



QUALITY OF LIFE IN ADOLESCENCE WITH ACNE -BEFORE AND AFTER TREATMENT

Dermatology

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ABSTRACT

Acne vulgaris is the commonest skin condition in adolescence all over the world. Using QoL (Quality of life) assessment tool it can improve clinician awareness of patient's perspective, the burden the patient and their family experiences. The aim of the present study is to assess the quality of life among adolescents with mild to moderate acne vulgaris and its correlation with the severity of disease before and after treatment at a tertiary care center. It's a prospective study conducted on 95 patients of either sex, aged between 12-18 years who had been clinically diagnosed with mild to moderate Acne vulgaris. The acne severity was assessed using GAGS score and they were asked to complete two questionnaires DLQI and CADI. t-test was used for testing mean values and data analysis. The mean baseline DLQI (6.9) and CADI (6.1) were high as compared to that after 24 weeks of treatment. In CADI subdomain, the questions related to psychosocial consequences of acne affected the most in both sexes. There was a statistically significant correlation (r-value 0.711, p-value <0.001) between the DLQI and CADI scores of the participants at presentation.

KEYWORDS

Acne, Global Acne Grading Score (GAGS), Quality of Life (QoL), Dermatology Life Quality Index (DLQI), Cardiff Acne Disability Index (CADI).

INTRODUCTION

Acne vulgaris is arguably the commonest skin condition with a lifetime prevalence of more than 70% in the global general population. It is a chronic inflammatory disease of the pilosebaceous duct, manifesting as seborrhea, comedones, papules, pustules, nodules, cysts, and generally heals with scars, and in rare cases keloids, which persist for the rest of the life. It has been widely reported that acne vulgaris affects people from all walks of life equally, with no differences being observed between their ethnicity, geographical location, or socioeconomic status.

The concept of adolescence is derived from a Latin term that signifies "to mature or grow up." Globally, there are approximately 1.2 billion young people between the ages of 10 and 19, making up one-fifth of the planet's population. At present, every fifth person worldwide is in their adolescent years, with 85% of these young individuals residing in developing nations. Specifically, in India, adolescents constitute 20.07% of the country's overall population, equating to over 200 million individuals. This phase in life presents a significant opportunity for young people's growth, serving as a critical period for enhancing their development.

Acne vulgaris is not a life-threatening condition, and usually associated with little, if at all, long-term adverse events and/or sequelae. However, since it affects humans in their adolescence, which is a period of life filled with tumultuous mental state and conflicting emotions, the disease is often associated with severe, if not serious adverse effects on interpersonal relationships and social acceptance, leading to generation of inhibition, timidity, and anxiety among adolescents, which often persist late into adulthood or even throughout life. This translates to significant adverse effect in the quality of life of the affected persons. Additionally, studies indicate that conditions such as anxiety and depression are notably more common in individuals with acne compared to those without the condition. Suicidal thoughts have been identified in 6–7% of individuals with acne.

Quality of life impairment is an important concept and it should be used in routine practice. Using QoL (Quality of life) assessment can improve clinician awareness of patient's perspective, the burden the patient and their family experiences. There are reports suggesting that the emotional impact from acne vulgaris may be equivalent to asthma or epilepsy, diseases whose interference on QoL are already a stigma.

Quality of life questionnaires include the Dermatological Life Quality Index, Skindex, Skindex-29, Skindex-16, Dermatological Quality of Life Scale, and the Questionnaire of Chronic Skin Disorder. The Dermatological Life Quality Index (DLQI) is the most commonly

utilized tool in both research and clinical settings to evaluate the health-related quality of life. The acne-specific questionnaires are tailored to assess the effects of acne, omitting symptoms that are not relevant. Measures specific to acne quality of life include the Cardiff Acne Disability Index (CADI), Acne Disability Index (ADI), Assessment of the Psychological and Social Effects of Acne (APSEA), Acne Quality of Life (AQoL), Acne-Quality of Life Index (QoLI), Acne-QoL, and Acne Q4.

There is a severe dearth of research exploring the dermatological and psychological quality of life among adolescents suffering from acne, especially in the developing countries such as India. In this context, the present study was planned to assess the quality of life among adolescents with mild to moderate acne vulgaris and find out the correlation, if any between the severity of the disease and the quality of life among patients visiting a tertiary care hospital of Haryana, India.

MATERIALS AND METHODS

The study is an institution-based prospective study conducted at the Department of Dermatology, Venereology and Leprology of a Tertiary Care Centre at North India for a period of 12 months. A consecutive sampling technique was used to recruit patients in the study. The study population consisted of patients of either sex, aged between 12-18 years who had been clinically diagnosed with mild to moderate Acne vulgaris. Patients of severe acne vulgaris, nodulocystic acne, acne conglobate, acne fulminans, steroid induced acne and patients already on treatment for acne were not included in the Sample size

The study considers a 95% confidence interval to estimate the sample size. According to the research conducted by Hay et al., there is 9.4 % global prevalence of acne vulgaris. Considering loss of follow up, sample size was calculated as 95.

Data collection

Each participant was selected after informing them about the study and obtaining written consent (parental consent since age <18 years of subjects). Each patient was then assessed by a Dermatologist. The demographic data collected included age, gender, duration of acne, type of acne, type of lesions, site of distribution, history of steroid abuse, family history of acne, history of hormonal imbalance and other relevant findings. A detailed history of all the patients was taken to rule out all the exclusion criteria.

The clinical severity of acne was then graded and recorded (as mild, moderate, severe or very severe) according to global acne grading system (GAGS) based on the total score: 0 for none, 1-18 for mild, 19-30 for moderate, 31-38 for severe, and more than 39 for very severe

acne Those with severe or very severe acne vulgaris were excluded from analysis. After the consultation and written informed consent, baseline photographs were taken on day 1.

Each subject was invited to complete DLQI and CADI questionnaire in a private waiting area. The Dermatology Life Quality Index (DLQI) comprises 10 questions covering six dimensions of life affected by acne: symptoms and feelings, daily activities, leisure, work and school, personal relationships, and treatment. The total score, ranging from 0 to 30, was obtained by summing up the scores from each question. The impact of acne on quality of life (QoL) is graded as follows: 0 to 1 signifies no effect, 2 to 5 a small effect, 6 to 10 a moderate effect, 11 to 20 a very large effect, and 21 to 30 an extremely large effect on the patient's QoL.

The Cardiff Acne Disability Index (CADI) is a five-question survey designed to measure the disability caused by acne in teenagers and young adults. The CADI score, which can range from 0 to 15, is calculated by summing the scores of each question. A score of less than 5 indicates low disability, 5 to 9 medium disability, and 10 to 15 high disability due to acne.

The DLQI and CADI scores were then entered in excel sheets and scores were recorded in data collection form. Patient were then started on topical and/or systemic therapy after clinical and QOL assessment. Treatment was decided individually by Dermatologist depending upon the severity of acne vulgaris whether mild or moderate. No aesthetic, invasive or surgical intervention was done. Treatment was decided based on the guidelines of care for management of acne vulgaris¹⁸ as shown in the table 1 below.

	MILD	MODERATE
1 ST LINE THERAPY	Benzoyl Peroxide (BP) or Topical Retinoid -or- Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic	Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic -or- Oral Antibiotic + Topical Retinoid + BP -or- Oral Antibiotic + Topical Retinoid + BP + Topical Antibiotic
ALTERNATIVE TREATMENT	Add Topical Retinoid or BP (if not on already) -or- Consider Alternate Retinoid -or- Consider Topical Dapsone	Consider Alternate Combination Therapy -or- Consider Change in Oral Antibiotic -or- Add Combined Oral Contraceptive or Oral Spironolactone (Females) -or- Consider Oral Isotretinoin

Follow up of every subject was done in Dermatology OPD at 12 weeks and at 24 weeks. At the end of 24 weeks both clinical and QOL assessment was repeated and recorded in data collection form.

Data Management And Statistical Analysis

The gathered data were scrutinized for accuracy, completeness, and subsequently inputted into a Microsoft Excel (MS-Excel, Microsoft Corp.) spreadsheet. Analysis was conducted using the Statistical Package for the Social Sciences (IBM SPSS, version 22). For the analytical part of the study, statistical significance was determined by a p-value of less than 0.05. Analytical statistics involved the use of the Chi-square test for categorical variables and the Student's t-test for continuous variables.

Ethical Consideration

The Institutional Ethics Committee of the Tertiary Care Centre in North India reviewed and approved the project before it was carried out.

RESULTS

In this institution-based Prospective Observational Study, 95 patients of either sex, aged between 12 and 18 years with clinically diagnosed acne vulgaris were assessed and then followed up for 24 weeks after starting their treatment. The quality of life of these patients was

assessed at the baseline and at 12 and 24-week follow-ups. It was observed that at 12 weeks of treatment, 9 patients were lost to follow-up, and no further loss to follow-up occurred till 24 weeks. The findings of these patients are discussed henceforth.

The mean age of the study participants was 17.2 ± 1.4 years, with majority of the participants (76.8%) belonging to the age group 16-18 years. **Table 2** shows proforma based characteristics of the participants that includes mean age, gender, residence, family history and H/O steroid abuse.

Table 1: Proforma based characteristics of the participants (n=95)

	BASELINE	12 WEEKS	24 WEEKS
DLQI	6.9	4.8	3.8
CADI	6.1	4.2	3.2
PARAMETERS	MEAN +/- SD / n (%)		
MEAN AGE	17 +/- 1.4 years		
GENDER	MALE – 41.1 FEMALE – 58.9		
RESIDENCE	RURAL – 23.2 URBAN – 76.8		
FAMILY HISTORY	POSITIVE – 11.6 NEGATIVE – 84		
H/O STEROID ABUSE	POSITIVE – 20 NEGATIVE – 80		

A striking 98.9% of the study participants had achieved pubarche at the time of their interview, indicating that the vast majority were undergoing or had undergone the physiological changes associated with puberty.

As per the Global Acne Grading System score (GAGS), it was seen that 69.6% of the women and 79.5% of the men were suffering from moderate acne as per the GAGS. The quality of life of the participants was measured using two scales, the Dermatological Life Quality Index (DLQI) and the Cardiff Acne Disability Scale (CADI). Table 3 shows the mean values of DLQI and CADI scores at baseline, at 12 and 24 weeks. Statistical analysis showed that the mean DLQI and CADI score of the participants was significantly better at both 12 and 24 weeks as compared to baseline.

It was observed in the present study that there was a strong positive correlation (r-value 0.711, p-value <0.001) between the DLQI and CADI of the study participants at the time of their admission.

Table 4. Distribution of study participants according to their DLQI category at 0, 12, and 24 weeks (n=95)

DLQI category	0 weeks	12 weeks	24 weeks	p-value
No effect (0-1)	1 (1.1)	3 (3.5)	8 (9.3)	*
Small effect (2-5)	37 (38.9)	54 (62.8)	64 (74.4)	
Moderate effect (6-10)	46 (48.4)	28 (32.5)	13 (15.1)	
Very large effect (11-20)	11 (11.6)	1 (1.2)	1 (1.2)	
Total	95 (100)	86 (100)	86 (100)	

*Statistically significant

Table 5. Mean DLQI subdomain score among study participants at the time of their admission (n=95)

DLQI subdomain	Male	Female	p-value
Symptoms and feelings (Q1-2)	2.8±0.9	3.1±1.1	0.171
Daily activities (Q3-4)	1.3±1.1	1.1±1.0	0.401
Leisure (Q5-6)	0.8±1.1	0.7±1.1	0.589
Work and school (Q7)	0.2±0.4	0.1±0.4	0.427
Personal relationships (Q8-9)	1.2±0.8	1.3±0.8	0.505
Treatment (Q10)	0.5±0.6	0.8±.8	0.151
Total score	6.9±3.4	7.1±3.8	0.723

Interpretation: It was seen that the subdomain most affected in the participants was symptoms and feelings. There was no statistically significant difference between males and females with respect to their DLQI score at the initiation of treatment.

Table 6. Distribution of study participants according to their CADI category at 0, 12, and 24 weeks (n=95)

CADI category	0 weeks	12 weeks	24 weeks	p-value
Not impaired (0)	0 (0)	0 (0)	2 (2.3)	<0.001*
Mildly impaired (1-5)	41 (43.2)	64 (74.4)	75 (87.2)	

Moderately impaired (6-10)	46 (48.4)	22 (25.6)	9 (10.5)	
Severely impaired (11-15)	8 (8.4)	0 (0)	0 (0)	
Total	95 (100)	86 (100)	86 (100)	

*Statistically significant

Interpretation: A Cochran's Q analysis showed that there was a statistically significant conversion of CADI scores of the participants from moderately and severely impaired to mildly and nor impaired at the end of the follow-up period.

Table 7. Mean CADI subdomain score among study participants at the time of their admission (n=95)

CADI subdomain	Male	Female	p-value
Psychosocial consequences of acne	2.9±1.6	3.1±1.3	0.645
Avoidance of public places	0.4±0.1	0.5±0.1	0.437
Perceived severity of disease	3±1.3	2.9±1.3	0.694
Total score	6.1±2.9	6.1±2.7	0.957

Interpretation: It was seen that the CADI subdomain most affected in the participants were psychosocial consequences and severity of disease. There was no statistically significant difference between males and females with respect to their DLQI score at the initiation of treatment.

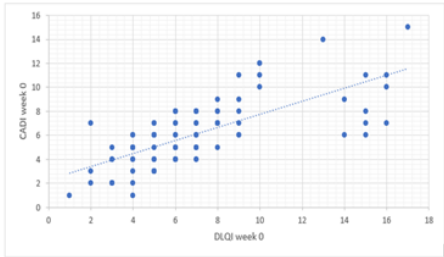


Figure 1. Association between DLQI and CADI of the participants at the time of admission (n=95)

Table 8. Association between DLQI and CADI of the participants at the time of admission (n=95)

Parameters	mean±SD	r-value	p-value
DLQI	6.9±3.6	0.711	<0.001*
CADI	6.1±2.7		

***Statistically significant Interpretation:** It was seen that there was a statistically significant strong association between the DLQI and CADI scores of the participants at the time of their admission to the study institution.

DISCUSSION

Acne vulgaris, presents a significant dermatological concern in India, affecting individuals predominantly during their adolescent years but not uncommonly extending into adulthood. The present study aimed to assess the quality of life among adolescents with mild to moderate acne vulgaris and find out the correlation, if any between the severity of the disease and the quality of life among patients visiting a tertiary care hospital of Haryana, India.

The mean age of the study participants was 17.2±1.4 years, with majority of the participants (76.8%) belonging to the age group 16-18 years. In studies conducted among adolescents, similar mean age has been reported. El-Hamd reported a mean age of 16.84±0.87 years, while Gupta et al. also reported that majority (72%) of the participants belonged to age group of 16 years or above.^{36,41}

As for the sex distribution of the participants, it was seen that there was a female preponderance (58.9%), with the male: female ratio of the condition being 1:1.4. Female patients being more affected than males, as was observed in the present study, have been reported by Bajawi et al. (71%), Raju et al. (male: female 1:1.5), and El-Hamd (60%).^{38, 40, 41} Ogedegbe et al. also reported a higher prevalence of acne among women than men (male: female 1:1.1).³³ On the other hand, authors such as Durai et al., Pandey et al., and Yoqub et al. reported that males were more affected than females in their study samples.^{9,15,47}

On assessment of the acne related characteristics of the study participants, it was observed that 11 (11.6%) of the participant had a positive family history of acne vulgaris. Previous research has

consistently supported the notion that individuals with a family history of acne are at a heightened risk of developing the condition themselves.. Hosthota et al. also observed that 10% of their participants had a positive family history of acne.³⁵

As per the Global Acne Grading System score (**GAGS**), it was seen that 69.6% of the women and 79.5% of the men were suffering from moderate acne as per the GAGS. In their study on 787 patients, Tayel reported that majority of the participants were diagnosed with mild acne as per the GAGS. This discrepancy might be due to the inherent physiological difference between the two study populaces or the difference in exposures and risk factors.⁴⁵ Ogedegbe et al. Molayi et al., and Sadowsky et al. also observed similar findings, reporting most of the participants suffering from moderate acne as per GAGS score.^{Error! Bookmark not defined., Error! Bookmark not defined., 53}

The quality of life of the participants was measured using two scales, the Dermatological Life Quality Index (DLQI) and the Cardiff Acne Disability Scale (CADI) Statistical analysis showed that the mean DLQI score of the participants was significantly better at both 12 and 24 weeks as compared to baseline. Furthermore, DLQI at 24 weeks was also significantly better as compared to 12 weeks' measurements. In their study, Durai also reported that the mean DLQI of the participants in their study was 6.9.⁹ While Singh et al. reported a mean score of 4.9, in their study, Chilicka et al. also reported that the mean DLQI in the participants at the time of starting of treatment was 7.2.^{51,52}

When categorized, it was seen that there was a statistically significant conversion of DLQI scores of the participants from moderate (48.4%) and very large effects (11.6%) at baseline to small (74.4%) and no effects (9.3%) at the end of the follow-up period. When the individual subdomains of the DLQI of the participants was analyzed at the baseline, it was seen that the highest affected was the symptoms and feelings subdomain, and while women scored higher than men in most of the DLQI subdomains, the difference was not statistically significant. The categorization of DLQI scores revealed a profound shift in the impact levels of acne on the participants' lives. Initially, 48.4% of the adolescents experienced moderate impacts, and 11.6% reported very large effects of acne on their quality of life. By the conclusion of the 24-week follow-up period, a substantial majority (74.4%) reported only small impacts, with 9.3% indicating no detrimental effects on their quality of life. This significant conversion in DLQI scores underscores the efficacy of the treatment regimen in not only alleviating the physical symptoms of acne but also in enhancing the overall well-being of the adolescents. In their studies, authors such as Relijic et al., Durai et al., Pandey et al., Raju et al., Singh et al., and Chilicka et al. all reported that the DLQI scores of the participants improved significantly with their treatment.^{9,15,32,40,49,52}

Similar to DLQI, the mean **CADI score** in the participants at baseline was 6.1±2.7, which lowered to 4.2±2.2 at 12 weeks, and further to 3.2±1.8 at 24 weeks of follow-up. Statistical analysis showed that the mean CADI score of the participants was significantly better at both 12 and 24 weeks as compared to baseline. When categorized, it was seen that there was a statistically significant conversion of CADI scores of the participants from moderate (48.4%) and severely impaired (8.4%) at baseline to mildly (87.2%) and not impaired (2.3%) category at the end of the follow-up period. When the individual subdomains of the CADI of the participants was analyzed at the baseline, it was seen that the highest affected was the psychosocial consequences of acne subdomain among women, and perceived severity of disease among men, but the difference was not found to be statistically significant. The findings from the CADI analysis corroborate the DLQI outcomes, underscoring the multifaceted nature of acne's impact on adolescents. The significant improvements in CADI scores over the course of the study highlight the efficacy of comprehensive acne treatment strategies that address both the physical symptoms and the psychosocial challenges associated with the condition.. The mean CADI score before treatment as reported by Durai et al. was similar to what has been observed in the present study.⁹ Tayel et al., also reported similar findings, observing that 11.3% of the study participants had severely impaired quality of life as per the CADI score.⁴⁵

Moreover, the study's insights into the individual subdomains of the CADI emphasize the importance of personalized treatment approaches. Recognizing the unique ways in which acne affects adolescents' self-esteem, social interactions, and overall perception of their condition is key to developing targeted interventions that can

more effectively address these diverse needs. The progressive improvement in CADI scores from baseline through the 24-week follow-up demonstrates the potential for significant recovery in adolescents' quality of life with appropriate treatment.

It was observed in the present study that there was a strong positive correlation (r -value 0.711, p -value <0.001) between the DLQI and CADI of the study participants at the time of their admission. Durai et al., Kaikati et al., and Singh et al., also reported similar significant positive correlation between the two.⁹ Error! Bookmark not defined., 49 The DLQI encapsulates the impact of acne on patients' self-esteem, interpersonal relationships, and ability to perform daily activities, while the CADI specifically focuses on the psychological distress and social stigmatization caused by acne. The strong correlation between DLQI and CADI scores emphasizes the necessity for healthcare professionals to adopt a holistic approach in the management of acne, addressing both the physical manifestations of the condition and its psychological ramifications.

CONCLUSION

The findings of the present study indicate that

- Mild and moderate acne vulgaris can have an adverse effect on the quality of life of adolescents, primarily with respect to their self-image
- While women are more affected, the quality of life as measured by DLQI and CADI were comparable between the sexes
- There was a statistically significant strong positive correlation (between the DLQI and CADI scores of the patients).
- It was seen that a 24-week treatment regimen for acne significantly improved quality of life in all patients.

Therefore, the Quality of Life effects of acne vulgaris in adolescents should be kept in mind during their assessment, and prompt treatment should be initiated to improve both the clinical condition and their QoL.

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